United States Patent

[11] **3,575,185**

[72] Inventor **Daniel J. Barbulesco**
Dayton, Ohio

[21] Appl. No. **769,918**
[22] Filed **Oct. 23, 1968**
[45] Patented **Apr. 20, 1971**
[73] Assignee **General Motors Corporation**
Detroit, Mich.

[54] **SELF-CLEANING DISHWASHER STRAINER**
2 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **134/104,** 134/111, 210/167
[51] **Int. Cl.** **B08b 3/02**
[50] **Field of Search** ..... 134/10, 104, 111; 210/167 (Inquired)

[56] **References Cited**

UNITED STATES PATENTS

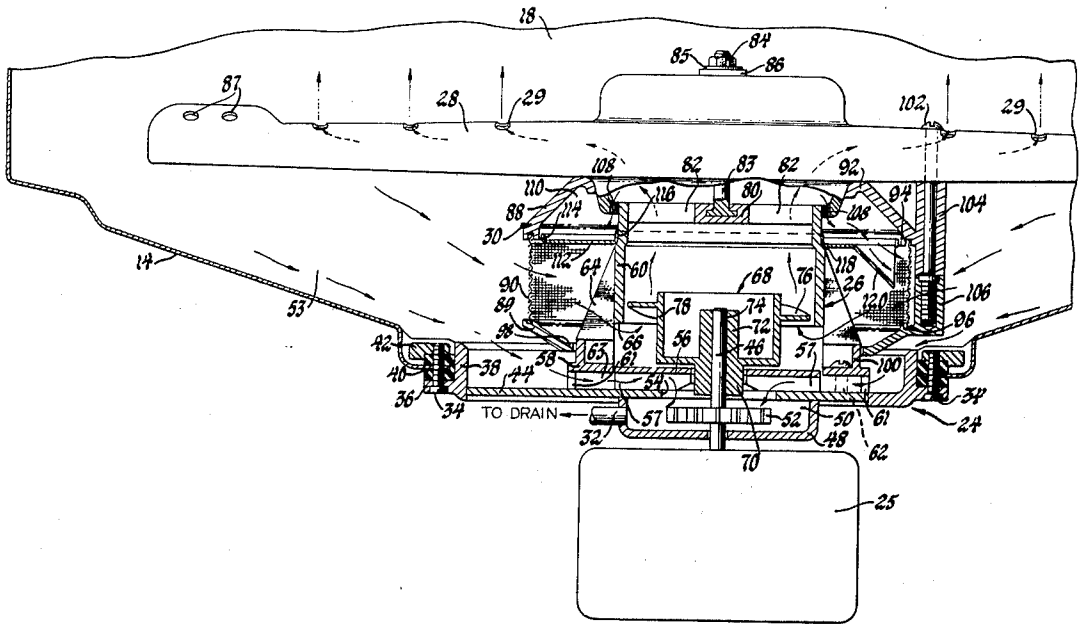
3,090,391	5/1963	Kaldenberg et al.	134/104
3,491,780	1/1970	Kaldenberg	134/104

FOREIGN PATENTS

1,186,767	2/1965	Germany	134/104

Primary Examiner—Daniel Blum
Attorneys—John C. Evans and Warren E. Finken

ABSTRACT: In preferred form, a domestic dishwasher including an improved self-cleaning strainer which removes food particles from washing fluid during its recirculation in a wash phase of operation. It includes an annular screen supported by a fluid distributing rotatable spray bar for rotation therewith and in surrounding relationship to a recirculating pump intake to prevent the entrance of food particles therethrough. A portion of the pump's output is diverted from the spray bar and directed by a stationary deflector plate through the revolving screen to backflush particles from the screen to prevent clogging. A drain pump with its inlet located below the screen removes both wash water and food particles from the dishwasher during a drain cycle.



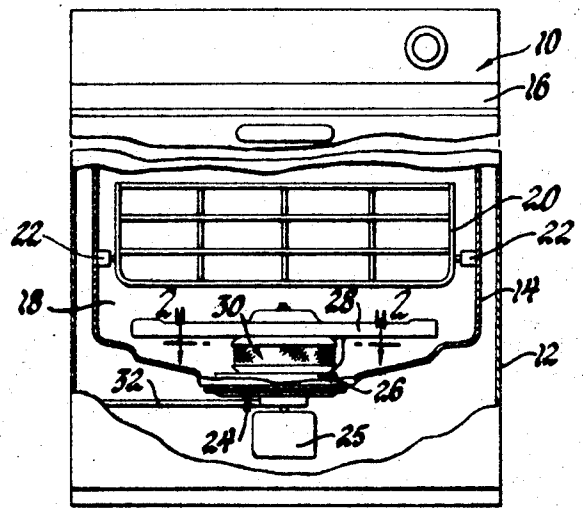


Fig. 1

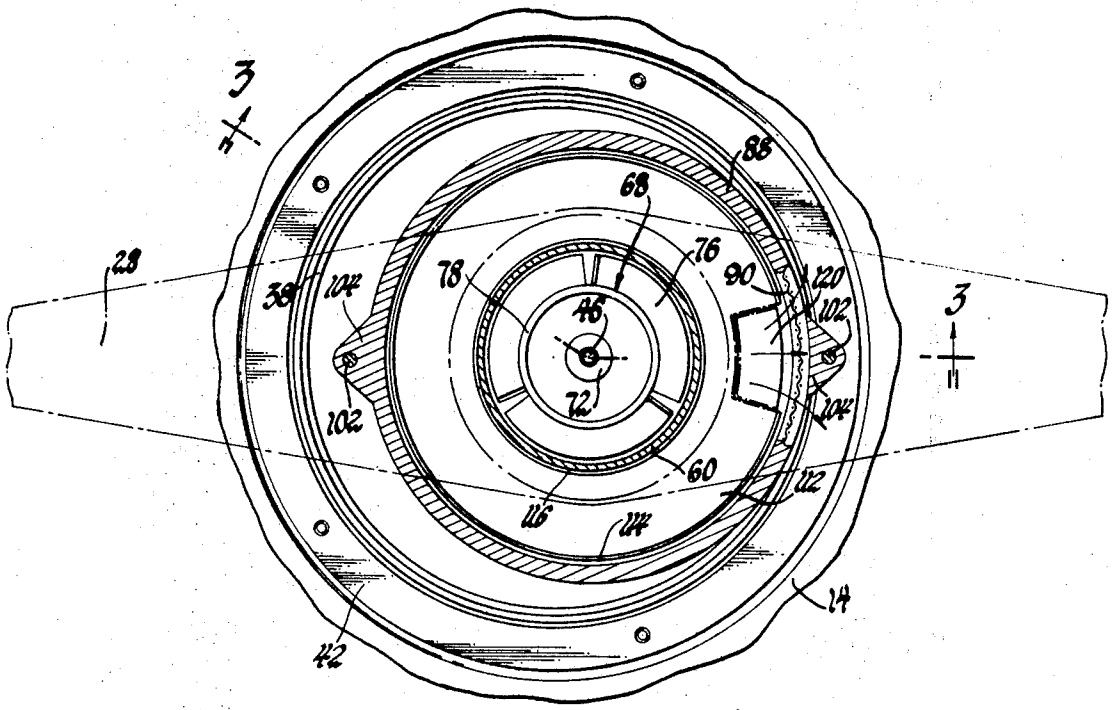


Fig. 2

INVENTOR.
Daniel J. Barbulesco
BY
J. C. Evans
ATTORNEY

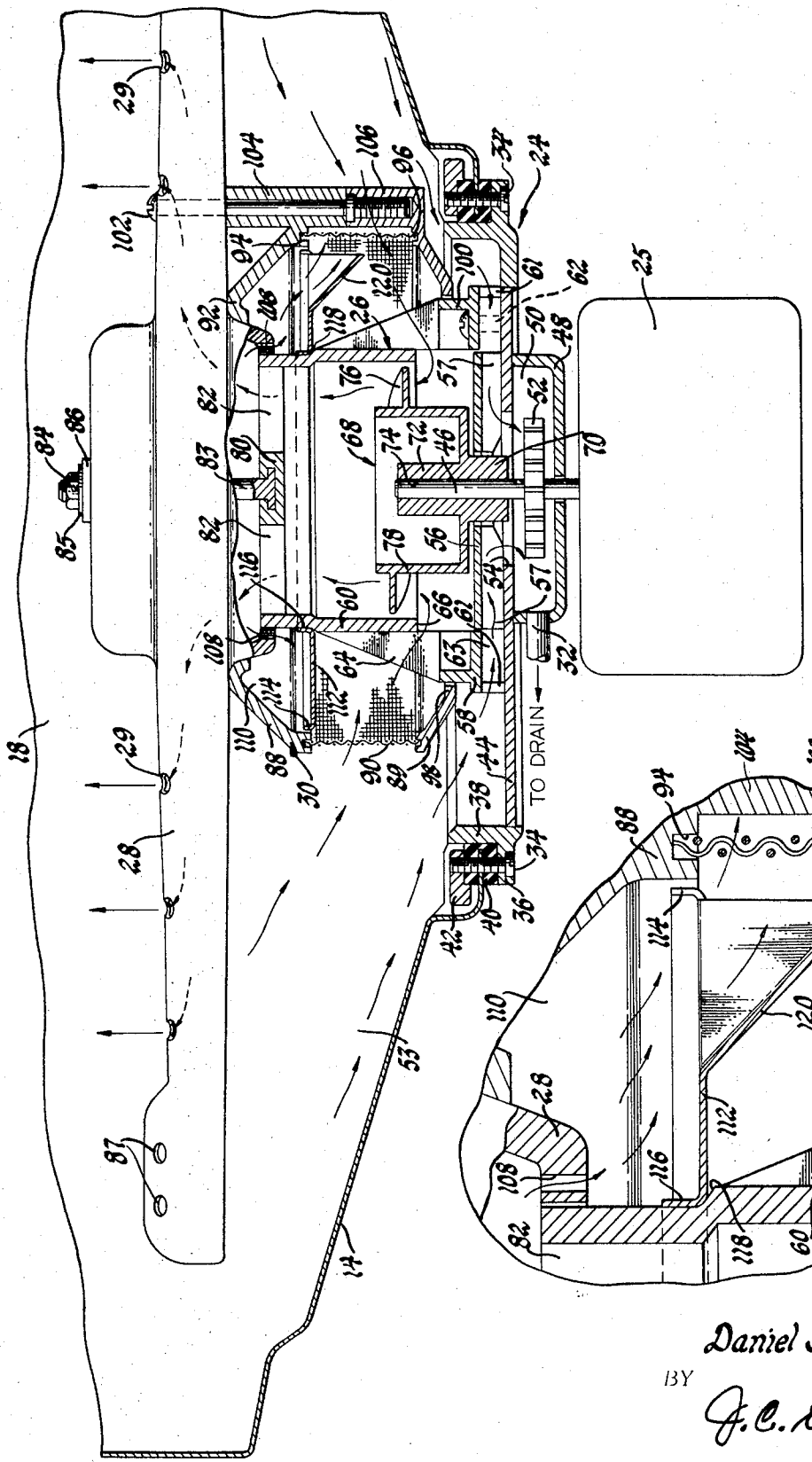


Fig. 3

Fig. 4

INVENTOR.
Daniel T. Barbulesco
BY
J. C. Evans
ATTORNEY

SELF-CLEANING DISHWASHER STRAINER

This invention relates to domestic dishwashers and, more particularly, to dishwashers having automatically operated self-cleaning strainers to prevent recirculation of food particles through the dishwasher compartment during a washing phase of operation.

Dishwashers normally recirculate water during the washing cycle by means of a recirculating pump to conserve both hot water and detergent. To prevent undesirable deposits of food particles on articles being cleaned, it is necessary either to carefully prerinse the articles before placement in the dishwasher or to strain the wash water during recirculation. The prerinsing step obviously constitutes more work for the user. Also, strainers must be cleaned periodically to avoid clogging.

An object of the subject invention is to avoid food particle deposits on articles in domestic dishwashers by the provision of a self-cleaning strainer located upstream of an intake to a recirculating pump and operative to strain food particles from the wash water without clogging the strainer.

A further object of the subject invention is to conserve hot water and detergent usage in domestic dishwasher apparatus by recirculating wash water and to avoid food deposits on articles by passing the wash water through a self-cleaning, straining apparatus including means for continually back flushing the straining apparatus during a washing cycle of operation.

Further objects and advantages of the subject invention will be apparent from the following description, reference being made to accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIG. 1 is a front elevational view, partially broken away and sectioned, of a dishwasher including the inventive self-cleaning strainer;

FIG. 2 is an enlarged horizontal cross-sectional view taken along section line 2–2 of FIG. 1 looking in the direction of the arrows;

FIG. 3 is a view in vertical section of the strainer assembly taken along section line 3–3 of FIG. 2 and including a spray bar in elevation; and

FIG. 4 is a fragmentary view in vertical section showing deflection means which directs a flow of cleaning water through the strainer to flush particles from its outer surface.

In FIG. 1 of the drawings, a dishwasher 10 is illustrated including an exterior cabinet 12 which encloses an inner dishwasher housing or tub 14. The tub 14 and a hinged cover 16 enclose a sealed interior space 18 in which dishes may be placed for washing. A rack 20 for holding dishes within the interior space 18 is supported by a plurality of brackets 22 which are attached to tub 14.

Supported in the bottom of tub 14 is a fluid distribution system 24 including an electric motor 25 driving a recirculating pump 26 which directs water and detergent to a rotating hollow spray bar 28 of the water reaction driven type having a plurality of ports 29 through which fluid is directed into the interior space 18 of tub 14. After striking the dishes within rack 20, fluid runs down the sides of tub 14 and collects in the bottom of the tub where it passes through a circular screen assembly 30 which is attached to spray bar 28 for rotative movement therewith. The water which passes through the screen assembly 30 is drawn into the inlet of pump 26 for recirculation through the spray bar 28. When the washing cycle is completed, the water within tub 14 is discharged through a drain conduit 32.

The circular screen assembly 30, which strains recirculating water to prevent food particles from entering pump 26, is shown in FIGS. 2 and 3 in more detail. The fluid distributing system 24 including motor 25, pump 26, spray bar 28, and screen assembly 30, is secured within an opening in the bottom of tub 14 by means including a plurality of screw fasteners 34. More particularly, screw fasteners 34 extend through a radially outwardly directed flange 36 on an annular mounting ring 38, through a resilient vibration dampening gasket 40 on the bottom of tub 14 and into threaded engagement with a clamp ring 42. Fixedly secured within the annular mounting ring 38 is a horizontally positioned floor plate 44 which, in combination with the mounting ring 38, supports the aforementioned fluid distribution system within tub 14.

Motor 25 has a rotatable shaft 46 which extends through floor plate 44 into the interior space 18 of tub 14. A cup-shaped drain pump housing 48 is secured to the underside of floor plate 44 to define a drain pump interior space 50 through which wash water may pass to the drain conduit during a drain cycle of dishwasher operation. A drain pump impeller 52 attached to the shaft 46 for rotative movement therewith has radially outwardly directed vanes thereon which draw water from a sump 53 in the bottom of tub 14 through a drain opening 54 in floor plate 44. From the interior space 50 the water is directed into drain conduit 32.

A separator plate 56 concentrically located around shaft 46 is secured to floor plate 44 in the interior space 18 and functions to separate drain flow from the fluid path through recirculating pump 26. It includes spaced depending walls defining plural radial passageways 57 leading to inlet 54. An annular base 58 of an upstanding tubular housing 60 of recirculating pump 26 is supported by a plurality of legs 61 on the floor plate 44 and is secured thereto by a plurality of screw fasteners 62 at a point radially outwardly from plate 56. Radially directed horizontal channels extend through the bottom of the recirculating pump housing 60 to form drain channels 63 communicating the sump region 53 with passageways 57 thence to drain pump inlet opening 54.

A plurality of upwardly directed vertical ribs 64 on the outer surface of housing 60 extend from the annular base 58 of the recirculating pump housing 60 to straighten flow into inlet openings 66 in the lower part of housing 60. A recirculating pump impeller 68 located within housing 60 adjacent inlet openings 66 therein is secured to shaft 46 for rotative movement therewith to draw water from the interior space 18 and pump it into the spray bar 28. The impeller 68 has a depending axially directed base portion 70 and an upwardly axially directed central hub 72 through which a concentric vertical bore 74 is formed to receive shaft 46.

A plurality of radially outwardly directed vanes 76 are formed on an annular outer surface of a cup-shaped segment 78 joined to hub 72. Vanes 6 have their tips located in close spaced relationship with housing 60 to move water from the interior space 18 axially upward through the housing 60 into spray bar 28.

The spray bar 28 is attached to a central hub 80 on spider arm 82 in the upper end of hosing 60 by a stud 83 having one end embedded in hub 80 and its opposite end threaded and directed through bar 28. The bar 28 is secured for free reactive rotation with respect to fixed stud 83 by means of a nut 84 on the end of stud 83 which bears against a washer 85 and a spray arm bearing 86 engaging the top of the spray bar 28. Water reaction ports 87 in the end of the bar 28 causes it to freely rotate on stud 83 so long as pump 26 is directing fluid into bar 28.

In accordance with certain principles of the invention, the circular screen assembly 30 is mounted for rotation with bar 28 and is concentrically positioned around the recirculating pump housing 60 to prevent the entrance of food particles into the pump inlets 66. The screen or strainer assembly 30 consists of two annular end portions 88, 89 with a cylindrical screen 90 held therebetween. The upper end portion 88 has an inwardly and downwardly turned upper lip 92 in sealing engagement with the outer surface of spray bar 28 at the inlet thereto.

The outer edge of end portion 88 is turned axially downward and has an annular groove 94 in its end face to engage the top edge of screen 90. The outer upper edge of base portion 89 is turned axially upward and has an annular groove 96 in its end face to engage the lower edge of circular screen 90. The lower base portion 89 of screen assembly 30

also has a radially inwardly turned edge **98** which encircles an axially upwardly directed annular flange **100** on housing base **58** in close spaced relationship therewith. As the edge **98** rotates relative to fixed base **58** it slings fluid to prohibit the flow of fluid from sump region **53** in bypassed relationship to screen **90**. End portions **88** and **89** holding screen **90** therebetween are held axially with one another and to spray bar **28** by a plurality of screw fasteners **102** which extend through the spray bar **28**, through a cylindrical upwardly directed extension **104** which is molded or otherwise attached to the outer edge of base portion **88** and threadably into a similar formed extension **106** on the outer edge of base portion **89**.

Screen **90** by virtue of the above-described structure is located about the recirculating pump inlets **66** to prevent the entrance of food particles therein so that a user may be relieved of the time consuming task of prerinsing or scraping the dishes. Another feature of the invention arises because food particles tend to collect on the outer annular surface of screen **90** as water flows radially inwardly thereof. This feature includes means which function to continually flush collected particles from the screen **90** concurrently with straining which occurs during recirculation of washing fluid that is incident to a dishwasher wash phase of operation.

More particularly, a plurality of axially directed ports **108** within the bottom portion of spray bar **28** receive fluid from the recirculating pump outlet and bypass it into an annular interior space **110** located between the screen assembly base portion **88** and the outer surface at the top of the recirculating pump housing **60**. A flat disc-shaped deflector plate **112** having axially upturned outer and inner edges **114**, **116** is supported by a shoulder portion **118** formed on the housing **60** to define a bottom boundary to the interior space **110** and a horizontal fluid collecting trough. A radially outwardly and downwardly formed outlet ramp **120** in the deflector plate **112** diverts fluid from the deflector plate **112** against the pump inlet side of the rotating screen strainer **90** in a radially outward direction to dislodge and flush away food particles from a limited arcuate extent of screen strainer **90** while other particles collect on the remaining extent of the outer annular surface of revolving screen **90**. As best seen in FIG. **4** when the screen assembly **30** rotates with the spray bar **28** in relation to the fixed cylindrical pump outlet **66** and its attached deflector plate **112**, a radially outward flow of water is continuously directed through the revolving screen by ramp **120** until all segments of the screen **90** are flushed. Food particles which are flushed from the outer surface of screen **90** sink toward floor plate **44** and are removed with the wash water through the drain paths **63**, **57** thence into the drain pump for discharge through conduit **32** during a drain cycle of operation.

For purposes of describing the present invention, there is no need to set forth details of an automatic dishwasher control system or the fill system and its control. However, the above-described self-cleaning strainer system is suited for use with dishwasher apparatus having the following working embodiment characteristics.

COMPONENT SCHEDULE

Motor **25** ——Reversible ⅓ HP @ 5.5 amps
Pump **26** ——70 gpm @ 7 feet H_2O head
Strainer **90** —Area 38 sq. in.

In the illustrated arrangement, the pump **26** during a wash phase is operated during one direction of rotor of motor **25** to draw fluid from sump **53** through screen **90** and discharge it into bar **28**. This produces the fluid distribution into space **18** discussed above. During this period, drain impeller **52** rotates within drain pump space **50** without drawing fluid through inlet opening **54**.

When motor **25** is conditioned for reverse rotation, the impeller **68** no longer pumps fluid from sump **53** and washing fluid recirculation is terminated. Such reverse motor rotation, however, causes impeller **52** to draw fluid from sump **53** through inlet **54** for discharge to conduit **32** during a drain cycle of dishwasher operation.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

I claim:

1. In a domestic dishwasher the combination of, a housing which encloses an interior space; an access opening through the housing for the placement of dishes in the interior space for washing; movable closure means for covering the access opening and sealing the interior space to prevent fluid leakage therefrom; recirculating pump means in the bottom of the housing having an inlet and an outlet for circulating fluid within the interior space; a fluid directing means fluidly connected to the pump outlet for distributing fluid within the interior space; said fluid directing means being supported within the interior space for rotative movement therein; a motor for driving said pump; screen filter means surrounding said inlet to prohibit entrance of food particles therein; said filter means including means for supporting it for rotative movement with said rotatable fluid directing means; a deflector plate located in a substantially horizontal plane on the pump inlet side of said filter means; passageway means for bypassing fluid from said fluid directing means onto said deflector plate; a downwardly, radially outwardly pointed ramp portion in the deflector plate for directing fluid through a limited extent of said filter means for flushing food particles from its outer surface; said pump inlet receiving fluid from the remainder of said filter means concurrently with flushing of said limited extent to strain particles from recirculated washing fluid.

2. In an improved domestic dishwasher of the type including a housing with an interior space, closeable access means through the housing for the movement of dishes therethrough for washing, fluid recirculating means having an inlet and outlet in the interior space, and a rotatable fluid directing means fluidly connected to the outlet for distributing fluid within the interior space, the improvement comprising: a circular strainer assembly encircling the inlet and attached to the rotatable fluid directing means for movement therewith; said strainer assembly having an annular screen therein to strain food particles from fluid passing to the inlet; a deflector plate within the strainer assembly in a substantially horizontal plane below the outlet; passageway means for bypassing fluid from the fluid directing means onto the horizontal deflector plate; a downwardly, radially outwardly pointed ramp portion in the deflector plate for directing fluid through the surrounding screen of the strainer assembly for flushing food particles from its outer surface while particles are being accumulated thereon.